



*Aquatic Enhancement
& Survey, Inc.*

**2007
Aquatic Plant Management Plan Update for
Jimmerson Lake
Steuben County, Indiana**

Prepared for the
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Executive Summary

Jimmerson Lake is a 346 acre oligotrophic glacial lake in Steuben County Indiana. It has a relatively large watershed of 52 square miles comprised largely of wooded, developed and agricultural lands. The vast majority of the watershed's drainage passes through a series of other large natural lakes (upper James Chain) before entering Jimmerson. The lake is ringed by a mix of riparian marshland and uplands. Nearly all lakeside uplands are developed with homes and cottages. The lake's islands and riparian areas contain several high quality wetlands. Jimmerson Lake has a unique and diverse aquatic flora with at least 21 species of submersed aquatic plants, two rare species and one threatened species. A luxuriant native plant community causes problems for some Jimmerson Lake residents by impeding navigation, swimming, and other recreational activities along lake frontages and a number of excavated channels. While a large variety of native plant species cause problems for lake residents, the native plants Variable watermilfoil *Myriophyllum heterophyllum*, and Vallisneria *Vallisneria americana* are especially troublesome. Variable watermilfoil impedes boat traffic and swimming in some areas by forming thick growths that reach the surface. This also results in large amounts of free drifting prop-cut Variable watermilfoil plants in the lake. In addition, Eurasian watermilfoil *Myriophyllum spicatum*, a highly invasive non-native species of aquatic plant causes problems in several areas by forming thick growths that impede recreation and displace the lake's native plant species. The excessive growth of Eurasian milfoil has caused ecological and recreational-use problems in channels, shoreline areas, and some offshore areas of the lake totaling approximately 16 acres. To help address this issue the *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006) has been developed though cost-share funding provided by the Indiana Department of Natural Resources Lake and River Enhancement Program (LARE) and the Jimmerson Lake Association. The purpose of the plan is to provide guidance to the Jimmerson Lake Association and the Indiana Department of Natural Resources for managing the lakes plant community to protect the ecological integrity and recreational and aesthetic value of the lake. The plan contains the following primary goals:

Goal 1. • Maintain a stable, diverse aquatic plant community that supports a good balance of predator and prey fish and wildlife species, good water quality and is resistant to minor habitat disturbances and invasive species.

Goal 2. • Direct efforts to preventing and/or controlling the negative impacts of aquatic invasive species.

Goal 3. • Provide reasonable public recreational access while minimizing the negative impacts on plant, fish, and wildlife resources.

This update summarizes plant management activities and the plant community and lake-user response that took place in 2007 under the plan, and provides a proposed course for future management that is consistent with the original plan goals. Approximately 16 acres of Eurasian watermilfoil were treated twice with IDNR LARE assistance to provide control of the plants and prevent vegetative spread in 2007. Additionally about 12 acres of developed shoreline areas were treated to control both native and exotic plant growth. This treatment was funded by the shoreline property owners and organized through the Jimmerson Lake

Association. The Jimmerson Lake Association also contracted for the treatment of approximately 10 acres of Variable watermilfoil in high traffic areas of the lake to assist with navigation and help reduce the amount of prop-cut plants accumulating on windward shorelines. The majority of residents reported that the shoreline treatment regime for the control of native and exotic plants was effective and the native milfoil treatments also provided effective control in 2007. While Results of the Eurasian milfoil treatments overall were good, the initial Eurasian watermilfoil treatment did not appear to kill 100 percent of the treated plants. The Jimmerson Lake Association may wish to consider repeating these treatments, but switching to a triclopyr herbicide (Renovate) to try to gain effective first treatment control of Eurasian watermilfoil. Looking toward the possible implementation of a legal speed limit in narrow downstream areas of the lake may also help with turbidity problems and the spread of invasive plants. Maintaining Eurasian watermilfoil or other exotic plants at an occurrence at or below five percent of Tier II sampling sites would be a reasonable goal for future seasons. A comprehensive plan should also be developed in 2008 to control colonization of the lake's wetlands by the non-native wetland plant Purple Loosestrife *Lythrum salicaria*. The total cost of the recommended control and monitoring for 2008 is expected to be \$29,000.00.

1.0 Introduction

There have been no significant changes in the current year.

See: *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006)

2.0 Watershed and Lake Characteristics

While the overall watershed and lake characteristics for Jimmerson Lake are similar to the prior year, significant changes in the immediate watershed continue. The below information from the 2006 update is repeated for 2007. No new studies related to fisheries, water quality, or the Jimmerson Lake watershed are known to have been completed in 2007.

Development of a large bay off of Jimmerson's south shore and other areas on the James Chain (upstream of Jimmerson) continues to occur rapidly. Because this development is a potential source of nutrient run-off to Jimmerson Lake care must be taken to see that proper erosion control techniques are employed and maintained. High quality wetland areas and the lake's exceptionally diverse plant community will be subject to degradation if proper precautions are not taken during critical construction phases in which soil is disturbed and eroded. (See figs. 1 and 2 below)



Fig. 1 Sites of construction and soil disturbance near Jimmerson's wetlands should employ proper practices to stabilize soil exposed to rainfall and runoff. Erosion control practices are critical to lake health in these areas.



Fig. 2 Soil eroding through unmaintained silt fencing near Jimmerson Lake accentuates the difference a standing section of silt fence can make in the transport of nutrient-carrying soils to the lake.

Eroding sediments originating at construction sites along Jimmerson's shoreline can introduce nutrients that affect water quality. The introduction of sediments and nutrients can also cause shifts in wetland and aquatic plant communities that indirectly affect water quality and the friendliness of the lakes plant community to both wildlife and recreation. The establishment and connection of the Jimmerson Lake residences to a centralized wastewater treatment plant is another recent watershed development with implications for aquatic plant control and water quality. Many private on-site septic systems were diverted to the new plant in 2005 and 2006. This undoubtedly reduced the nutrient loading to Jimmerson Lake. In some lake's this may affect the lake's plant community by initially increasing plant growth as a result of improved water clarity with a possible ultimate long-term reduction in plant growth as nutrient levels in the lakes hydrosol are reduced over time. Because Jimmerson Lake already exhibits excellent water clarity this effect is not likely to be large. The reduction in the lake's nutrient load, however, is likely to be beneficial in terms of water quality over the long-term and will help to

protect the diversity of the lakes native plant community. No other significant watershed changes were noted in 2007. For additional watershed information see: *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006)

3.0 Lake Uses

There have been no significant changes in the current year.

See: *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006)

4.0 Fisheries

There have been no significant changes in the current year.

See: *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006)

5.0 Problem Statement

There have been no significant changes in the current year.

See: *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006)

6.0 Vegetation Management Goals and Objectives

Aquatic pesticide applications in the 2008 season should seek to keep the occurrence of Eurasian watermilfoil in the 2008 late season Tier II protocol sampling from exceeding five percent. There have been no other significant changes in the current year.

See also: *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006)

7.0 Plant Management History

In May an exotic plant survey and mapping designated approximately 16 acres of Eurasian watermilfoil growth on Jimmerson Lake. The granular systemic aquatic herbicide 2,4-D was applied to these areas of the lake at the rate of 100 pounds per surface acre. The treatment was performed on May 25, 2007. In figure one below the marked areas represent the treatment areas and also the early-season pre-treatment distribution of dense Eurasian watermilfoil growth (all areas of growth were treated). A Tier II aquatic plant survey was performed on July 24. As in the previous year the Jimmerson Lake aquatic plant community showed exceptional diversity with at least 18 submersed species of plants present including two state designated “rare” and one “threatened” species. A post-treatment spot check revealed good results in most of the treatment areas but some Eurasian milfoil plants in lake margin treatment areas had not dropped out of the water column after treatment. During the July Tier II survey it was noted that regrowth of some Eurasian watermilfoil had occurred in most of the May treatment areas. A re-treatment (2,4-D) was applied to 16 acres of Milfoil impacted areas on July 31, 2007 with good results. In figure two below the marked areas represent the July treatment areas and also the late-season pre-treatment distribution of dense Eurasian watermilfoil growth (all areas of growth were again treated). In addition, herbicide treatments utilizing endothol, 2,4-D, diquat, and copper sulfate to control native and exotic plants along the shoreline of Jimmerson Lake were performed on June 11 and 12. The Jimmerson Lake Association determined these treatment areas by accepting treatment enrollments from lake property owners who had experienced problems with aquatic plant growth along their

frontages (see fig. 3). A follow-up treatment using a liquid chelated copper herbicide (Nautique) for late-season plants took place along the same frontages on July 16. Data was collected to gauge the effectiveness of this treatment but was not yet compiled at the time of its update. An additional Jimmerson Lake Association sponsored treatment for native Variable watermilfoil took place in designated high traffic areas of the lake on June 21 (fig. 4). A total of 10 acres was treated with 2,4-D granular herbicide at the rate of 100 pounds per acre with excellent results. It is unknown why Eurasian watermilfoil plants in some treatment areas did not fully respond to the initial treatment. Water movement, treatment timing, seasonal climatic conditions, water chemistry, or the reintroduction of new plant fragments can all affect treatment effectiveness and longevity. The 2007 regime added the second Eurasian milfoil treatment to insure effectiveness but the presence of live plants after the initial treatment suggests that a switch to another systemic herbicide is warranted to provide reliable control and prevent the further spread of this plant.

2007 Date	Activity	Approx. Acreage mapped/treated	Treatment Result	Funding
May 25	Seek and Destroy Treatment of all significant noted Eurasian watermilfoil with granular 2,4-D	16	Mixed results in lake margin or offshore treatments. Good results in channels.	JLA/LARE
June 11,12	Treatment for native and exotic plants along developed shorelines	11.46	Good Results	Private Homeowners through JLA
June 21	Treatment of dense Variable watermilfoil growth in high traffic areas	10.1	Excellent Results, no regrowth noted	JLA/LARE
July 16	Treatment for native and exotic plants along developed shorelines	16	Good Results	Private Homeowners through JLA
July 31	Seek and Destroy Treatment of all significant noted Eurasian watermilfoil with granular 2,4-D	16	Good Results	JLA/LARE

Table 1 Summary of Jimmerson Lake Herbicide Applications in 2007

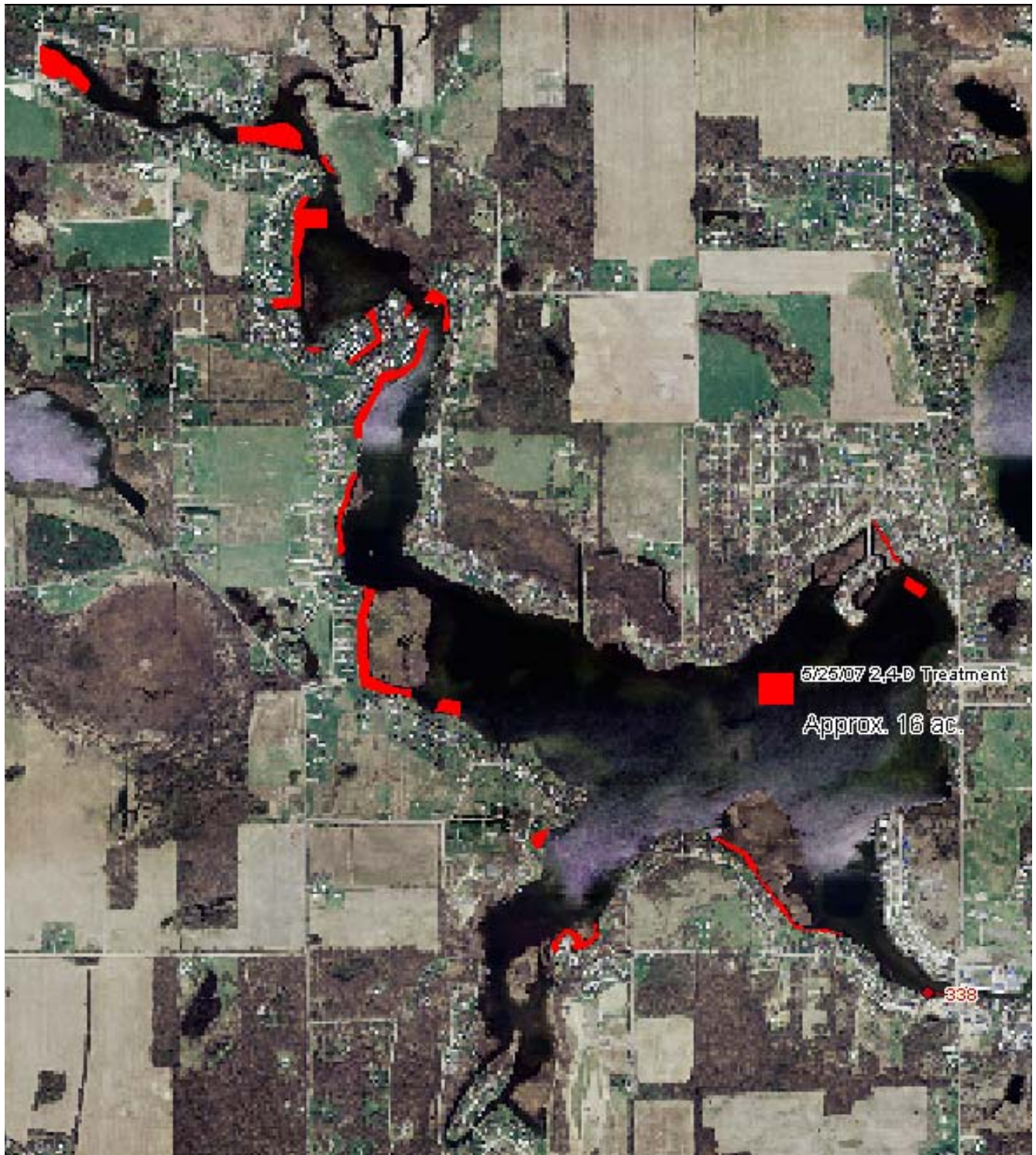


Figure 1 5/25/07 JLA/LARE Sponsored Eurasian Watermilfoil Treatment Areas. All areas of significant growth were treated so the marked areas also represent the early-season pre-treatment distribution of Eurasian watermilfoil growth.

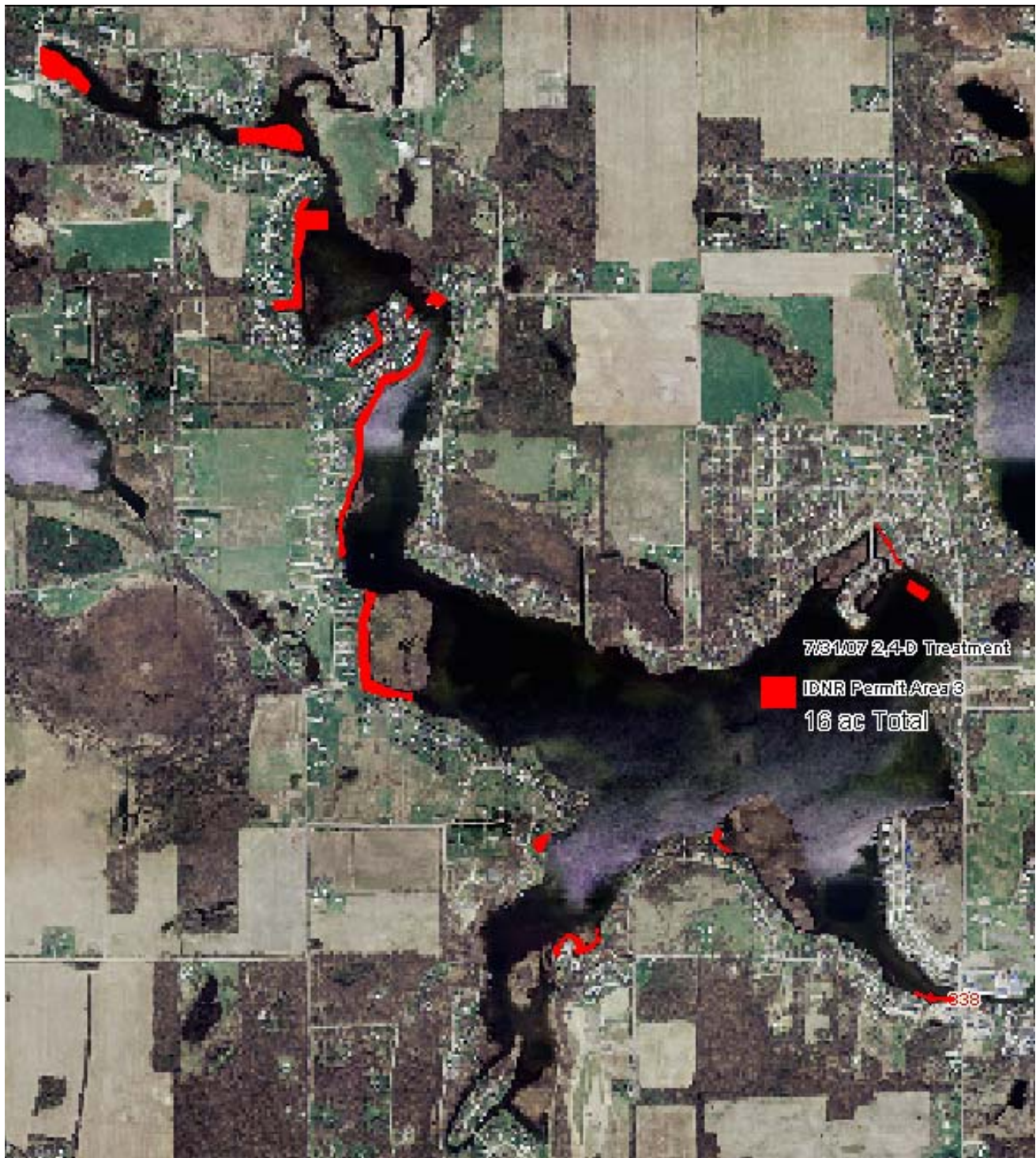


Figure 2 7/31/07 JLA/LARE Sponsored Eurasian Watermilfoil Treatment Areas (follow-up treatment). All areas of significant growth were treated so the marked areas also represent the late-season pre-treatment distribution of Eurasian watermilfoil growth.



Figure 3 JLA Organized, Privately Sponsored Treatment Areas for Native and Exotic Plants 6/11, 12/07 and 7/16/07 treatment dates.



Figure 4 JLA Sponsored Variable Watermilfoil “high use” Treatment Areas

8.0 Aquatic Plant Community Characterization

8.1 Methods

Two primary methods of observation were used to characterize the lake's plant community during the 2007 season. Exotic plant beds were mapped in 2007 mainly by visual observation. Extensive time was spent running a zigzag pattern over the lake's littoral zone to establish the boundaries for dense exotic plant growth. This replaced the Tier I reconnaissance survey protocol used in 2006. This was complimented by prior knowledge of the lake's typical invasive plant growth pattern. A handheld WAAS Enabled GPS unit was also helpful in marking the general boundaries of exotic plantbeds for mapping. The Tier II protocol used was similar to that used in 2006 with slight changes. (See: *Jimmerson Lake Aquatic Vegetation Management Plan Update, Steuben County, Indiana 2006* and *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006 for Tier II protocol discussion) In 2006 plant mass was measured as a rake score of one through five. In 2007 a score of one, three, or five was used.

8.1.1 Tier II

Tier II stratified random sampling was utilized on July 24, 2007 to establish random plant sampling points and quantify approximate species biomass at each respective point. The 80 sampling points used are displayed in figure 5 below. Based on the past Tier II procedure as previously specified by IDNR the sampling points were chosen randomly and did not repeat collections from sampling points designated in prior seasons. Repeated sampling points do not appear to be specified in the current Tier II protocol (May 2007), however IDNR review comments and personal communications since the fall of 2007 indicate that the most current method should incorporate collections from the same sampling points from season to season. Sampling in 2008 should be performed at the same set of sites utilized in 2007. The most current Tier II aquatic plant sampling protocol is available in full in *Tier II Aquatic Vegetation Survey Protocol, May 2007* (IDNR 2007). Results of the survey are discussed in the next section.

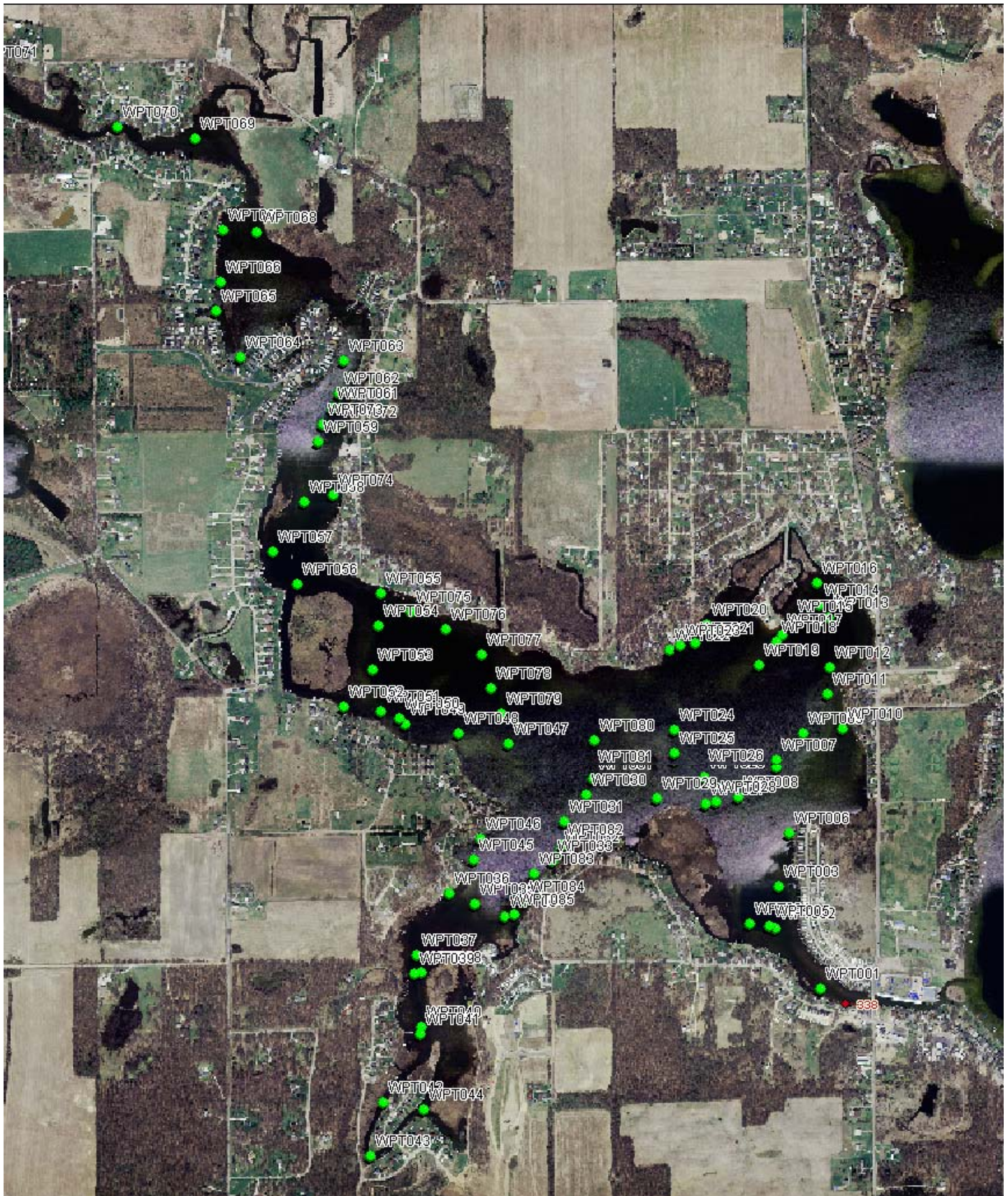


Figure 5 7/24/07 Tier II Sampling Points for Jimmerson Lake

8.2 Results

8.2.1 Tier II

Macrophyte Inventory Discussion

The two tables below contain plant community descriptors for the July 24, 2007 Tier II survey. Descriptors from a set of 21 other Indiana Lakes (Pearson 2004) are provided to provide insights about how the Jimmerson Lake plant community compares to that of other Indiana Lakes. With 18 species noted, Jimmerson displayed more than double the 21 lake average of eight. The number of native species, number of species per site, and Species diversity index are all well above the 21 lake averages showing an extremely diverse plant community for Jimmerson Lake. Much of the diversity of the Jimmerson Lake plant community is probably the result of good water quality and clarity. Jimmerson is rated as a Class One “oligotrophic” lake. A Secchi depth of 7.4 feet was recorded during the July 24, 2007 Tier II survey. This was very close the 2006 average for 83 monitored Indiana Lakes of 7.5 feet (Indiana Clean Lakes Program). In August of 2006 a Secchi depth of 11.8 feet was recorded, well above the average. Aquatic plants were noted to be growing to the 25 foot depth contour. Rake tosses beyond the 25 foot contour did not produce any plants in 2007 indicating that the maximum sampling depth was appropriate for conditions. Eurasian watermilfoil occurrence was very low at 1.3 percent (post treatment survey). Eurasian milfoil was only collected at one sampling site. The occurrence of Curlyleaf pondweed was also 1.3 percent. From the Tier II data it appears that holding the occurrence of both these plants to 5 percent of sampling sites or less is a reasonable goal for Jimmerson Lake. By number of occurrences *Chara Chara sp.* ranked first at 66.3 percent. Variable watermilfoil was second at 41.3 percent, while *Vallisneria* ranked number three at 33.8 percent of sites. The distribution of the major species collected in the survey was relatively even across the Jimmerson Lake Littoral Zone and did not indicate plant growth maximums around any obvious sources of nutrients, sediments, or disturbances (Figures 9, 10, and 11 below). Jimmerson Lake’s plant community was solidly dominated by beneficial native plant species in 2007. With an aggressive exotic plant treatment regime and proper care taken to protect the lake from in-lake disturbances and changes in the watershed the Jimmerson Lake Association should be able to maintain a healthy assemblage of native plants in Jimmerson Lake for the foreseeable future.

Rare, threatened, or endangered (RTE) plant species were collected at two points during the 7/24/07 Tier II survey (figure 6). Robbins fern *Potamogeton robbinsii* (state rare) was sampled at waypoint 36, and Richardson’s pondweed *Potamogeton richardsonii* (state rare) was sampled at waypoint 66. Figure 6 also displays two areas where beds of Robbin’s fern are observed growing each season. Richardson’s pondweed and Whitestem pondweed *Potamogeton praelongus* (state threatened) are commonly observed in many areas throughout Jimmerson Lake. Since vouchers for these plants were already collected in 2006 no new voucher specimens were taken in 2007. No new RTE species were confirmed in 2007 but it should be noted that Small pondweed *Potamogeton pusillus* observed and collected for identification in Jimmerson in 2006 is listed by the INDR Division of Nature Preserves as a “watch list” species. Three voucher specimens were collected from Jimmerson Lake in the 2007 season and sent to botanists at Purdue University North Central for identification (locations in figure 6). An unknown milfoil was collected at waypoint 23. It was identified as probably being Whorled watermilfoil *Myriophyllum verticillatum* or Northern watermilfoil *Myriophyllum sibiricum*. More plant material is needed to make a positive identification. A positive identification should be done in 2008 if possible. Whorled watermilfoil is listed as a state “rare” species. A second specimen was collected from waypoint 43. This plant was observed during the Weed Patrol, Inc. Surveys prior to 2006 and also during the 2006 and 2007 Aquatic Enhancement, Inc. surveys. It showed some resemblance to the emergent plant Water smartweed *Persicaria amphibia* but was growing as a completely submersed plant. Smartweed was also suspected by the botanists that received the plant at Purdue North Central, but floral characters will be needed for a positive identification. A third specimen was collected from

waypoint 85. It was suspected in the field to be Leafy pondweed *Potamogeton foliosus*. This was confirmed at Purdue University North Central. An effort should be made in 2008 to collect more plant material from the yet unknown species.

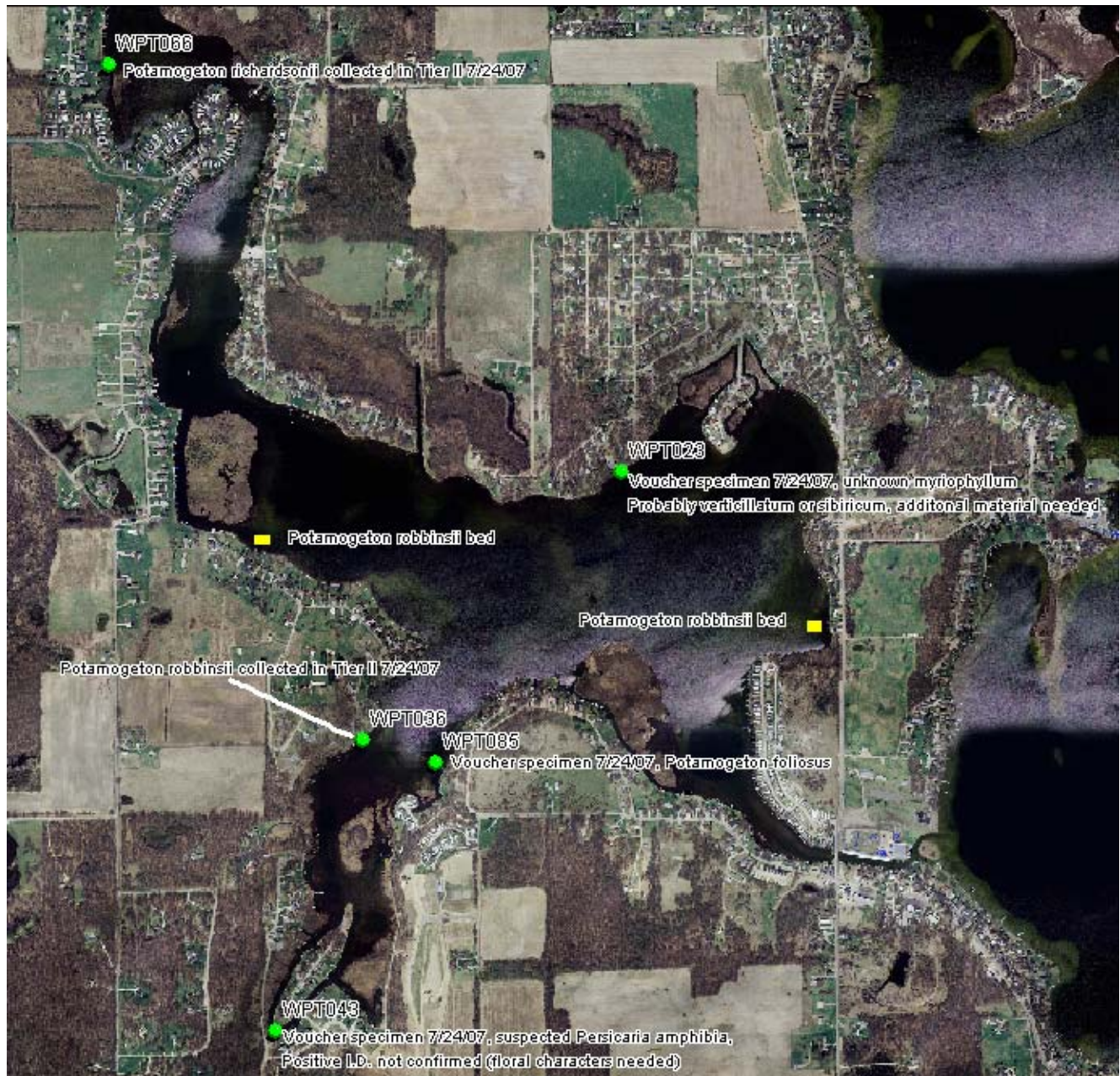


Figure 6 Waypoints where RTE or unidentified species were collected during the 7/24/07 Tier II. Also shown are two small plantbeds where Robbins Fern *Potamogeton robbinsii* has been observed growing in significant quantities.

Descriptor	Jimmerson Lake 7/24/07	range for 21 other Indiana lakes	mean for 21 other Indiana lakes
# Sampling sites	80		
Total number of species	18	1 to 17	8
Total number of native species	16	1 to 16	7
Mean number of species per site	2.5	.38 to 2.66	1.61
Species diversity index (SDI), 0-1 scale	.86	0.0 to .91	0.66
Aquatic Vegetation % frequency of Occurrence	96		
Secchi Depth	7.4		
Eurasian watermilfoil % Frequency of Occurrence	1.3		
Curlyleaf pondweed % Frequency of Occurrence	1.3		

Figure 7 Plant Community Descriptors for the Jimmerson Lake Tier II

Occurrence and Abundance of Submersed Aquatic Plants - Overall							
Lake: Jimmerson		Secchi(ft): 7.4		SE Mean species / site: 0.15			
Date: 7/24/2007		Littoral sites with plants: 77		Mean natives / site: 2.48			
Littoral Depth (ft): 25.0		Number of species: 18		SE Mean natives / site: 0.15			
Littoral Sites: 80		Maximum species / site: 6		Species diversity: 0.86			
Total Sites: 80		Mean species / site: 2.50		Native diversity: 0.86			
Species	Frequency of Occurrence	0	1	3	5	Dominance	
CHAR Chara	66.3	33.8	15.0	11.3	40.0	49.8	
MYRHET Variable milfoil	41.3	58.8	18.8	7.5	15.0	23.3	
VALAME Vallisneria	33.8	66.3	25.0	5.0	3.8	11.8	
NAJFLE Slender naiad	22.5	77.5	22.5	0.0	0.0	4.5	
UTRMAC Great bladderwort	21.3	78.8	18.8	2.5	0.0	5.3	
CERDEM Coontail	18.8	81.3	10.0	1.3	7.5	10.3	
POTZOS Flatstem pondweed	8.8	91.3	5.0	2.5	1.3	3.8	
POTGRA Variable pondweed	8.8	91.3	6.3	2.5	0.0	2.8	
POTILL Illinois pondweed	8.8	91.3	7.5	1.3	0.0	2.3	
NAJGUA Southern naiad	7.5	92.5	6.3	0.0	1.3	2.5	
ELOCAN Elodea	3.8	96.3	3.8	0.0	0.0	0.8	
POTROB Robbins fern	1.3	98.8	0.0	0.0	1.3	1.3	
MYRSPI Eurasian milfoil	1.3	98.8	0.0	1.3	0.0	0.8	
POTCRI Curlyleaf	1.3	98.8	1.3	0.0	0.0	0.3	
POTFOL Leafy pondweed	1.3	98.8	1.3	0.0	0.0	0.3	
POTPUP Small pondweed	1.3	98.8	1.3	0.0	0.0	0.3	
POTRIC Richardson's pondweed	1.3	98.8	1.3	0.0	0.0	0.3	
Sagittaria sp. (submersed)	1.3	98.8	1.3	0.0	0.0	0.3	

Figure 8 Overall Plant Community and Species Specific Descriptors for the Jimmerson Lake Tier II Survey

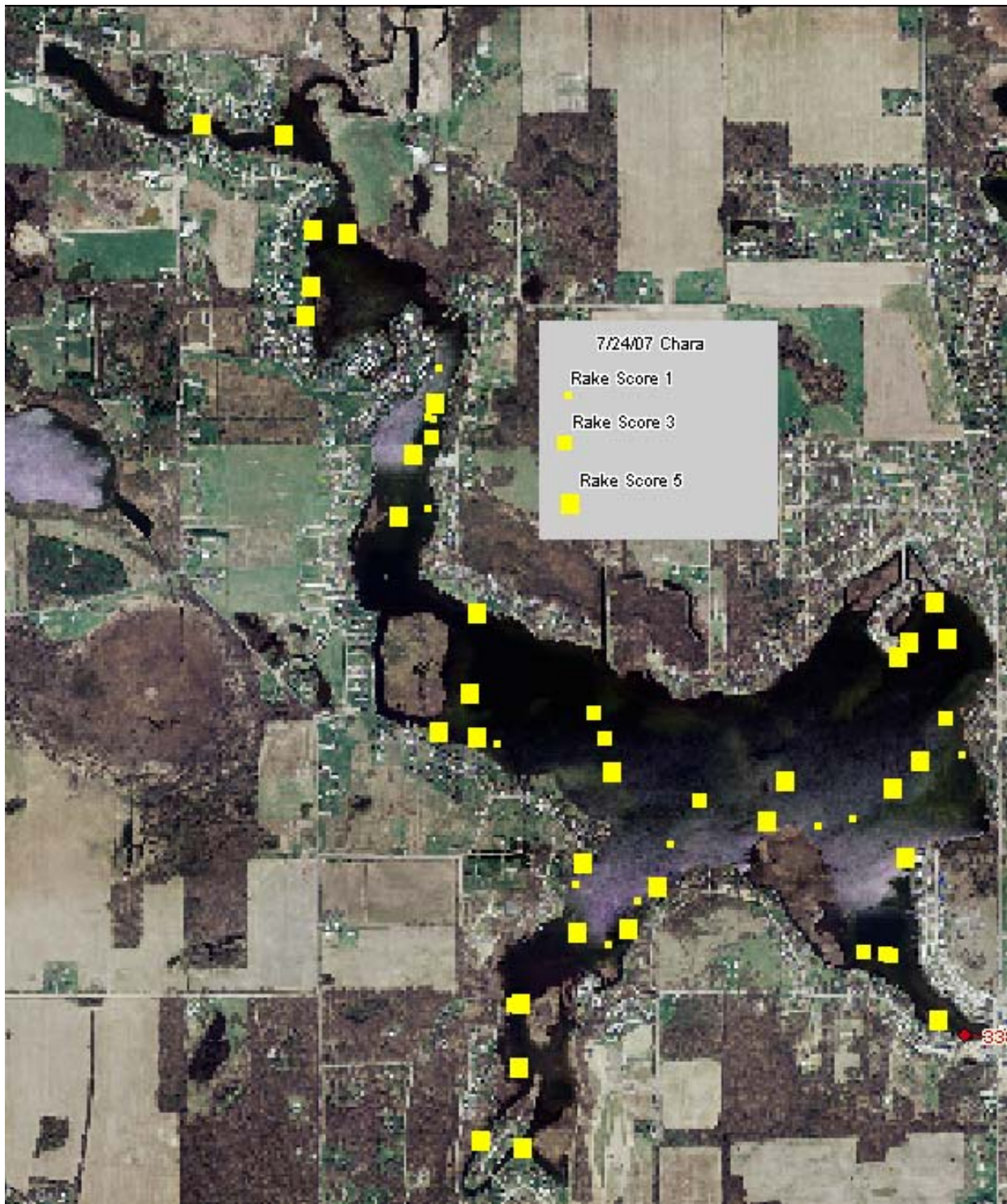


Figure 9 7/24/07 Tier II Sites Where Chara Occurred

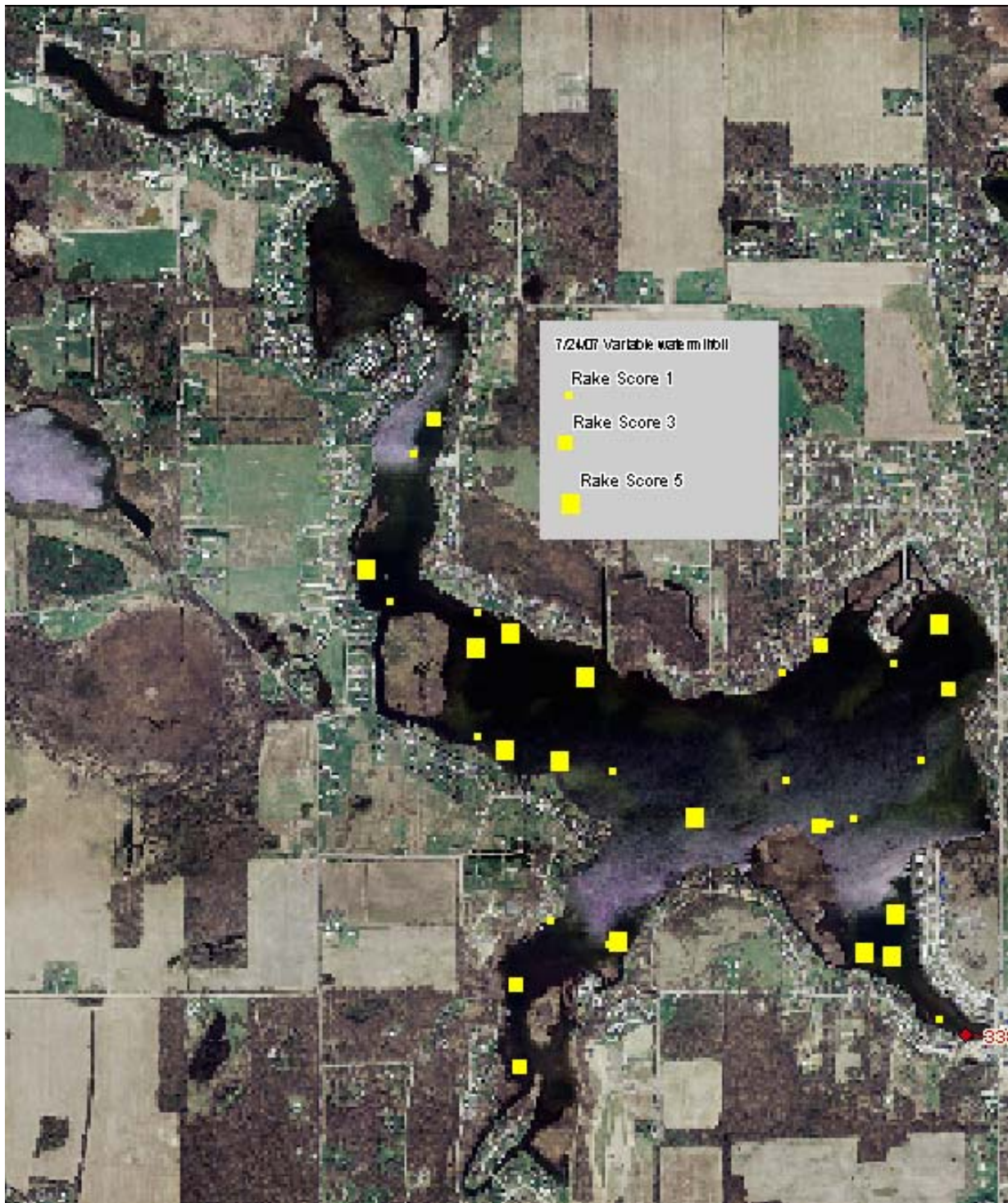


Figure 10 7/24/07 Tier II Sites Where Variable watermilfoil Occurred

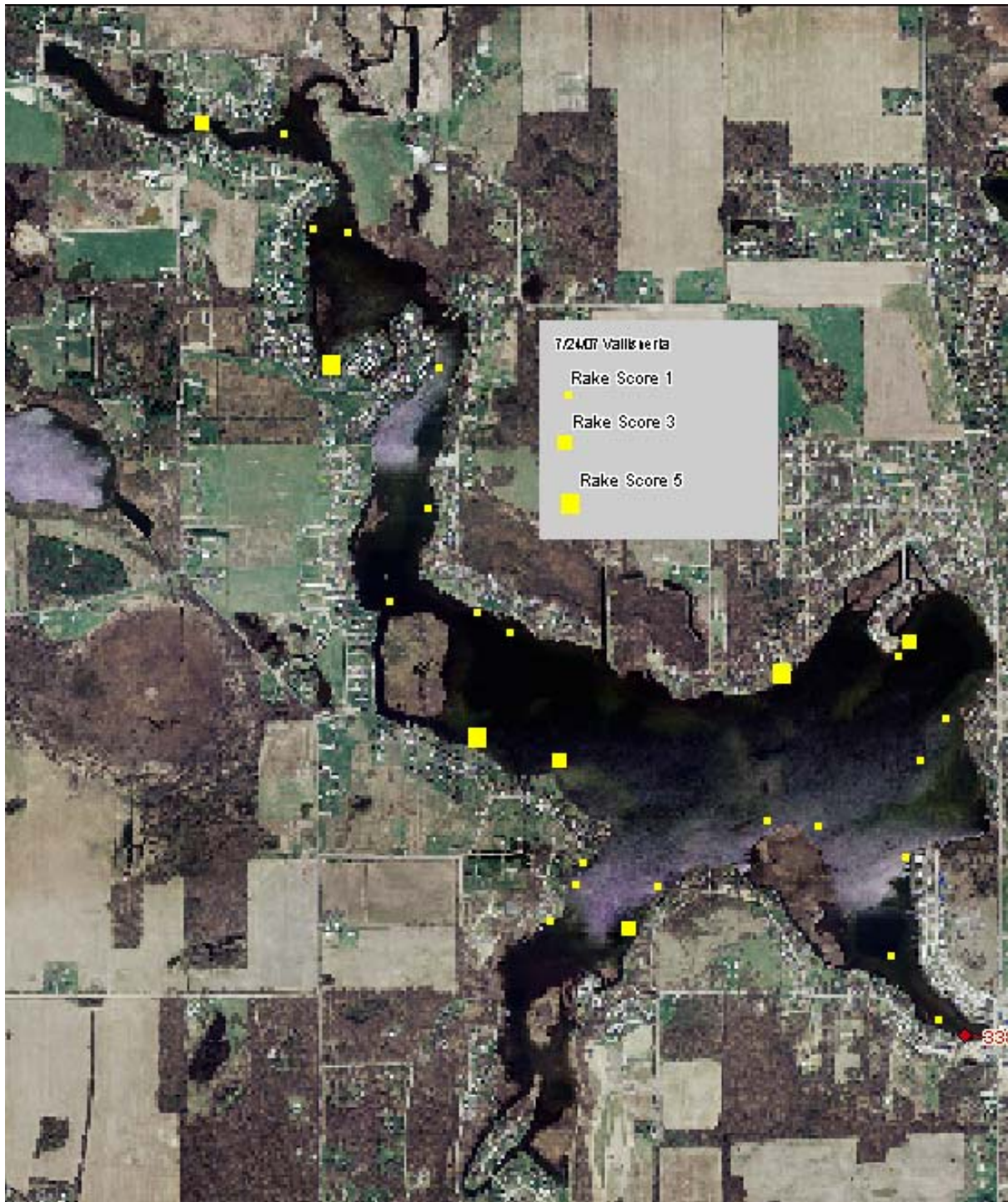


Figure 11 7/24/07 Tier II Sites Where Vallisneria (Tapegrass) Occurred

9.0 Aquatic Vegetation Management Alternatives

The complete list of management options remains similar to those in the original Plant Management plan. See: *Jimmerson Lake Integrated Aquatic Plant Management Plan 2006-2009* (Weed Patrol, Inc. 2006) Since some Eurasian watermilfoil at Jimmerson Lake appeared to show resistance to 2,4-D applications in 2007 and regrowth was experienced in nearly all treated areas it is advisable in the 2008 season to try an alternative aquatic herbicide. Trichlopyr (Renovate 3) has shown good results in controlling Eurasian watermilfoil and like 2,4-D has selective properties in controlling broadleaf plants. This means trichlopyr, like 2,4-D could be used to control Eurasian watermilfoil while having no effect on most desirable native species present in Jimmerson Lake. A solid flake formulation of this herbicide is available (OTF, on target flake) which can sink into plant foliage and the lake bottom and provide localized control in open-lake shorelines or areas of water movement. The Jimmerson Lake association is advised to switch to Renovate OTF as an alternative control for Eurasian watermilfoil growth in 2008. Water-use restrictions and effects on non-target plants are expected to be similar to 2,4-D.

10.0 Public Involvement

A public meeting for Jimmerson Lake's plant management program was incorporated into a regular association meeting on July 14, 2007. Sixteen people were in attendance. Information was presented by Aquatic Enhancement & Survey, Inc. about the aquatic plant management activities in 2007. A discussion was held about the status and goals of the Jimmerson Lake Plant Management Plan and opportunity was provided for attendees to ask questions and provide input regarding the current plant management and water-use restrictions involved. Purple loosestrife and Eurasian watermilfoil plants were provided to the attendees to help familiarize them with these invasive species. The appearance of Hydrilla in Lake Manitou and its implications for other lakes including Jimmerson was discussed. The lake user survey below was distributed to those present, filled out, and collected. Fifteen surveys were returned. All 15 respondents indicated that they were lake property owners. All indicated they were association members. When asked how long they had been at the lake eight respondents indicated they were 20+ year residents of Jimmerson Lake. Four indicated 11-20 years of residence. Two indicated 6-10 years. One respondent was a 0-5 year resident. When asked to mark ways in which they use the lake 15 respondents marked boating, 13 marked swimming, 12 marked enjoyment of the view as an activity, and 12 indicated they enjoy viewing wildlife. Eleven indicated that they ski or wakeboard/tube on the lake and eleven indicated they use the lake's waters for irrigation. Eight respondents indicated that they fish the lake. When asked whether Jimmerson Lake contained aquatic plants in nuisance quantities in 2007 twelve indicated that it did, two said it did not, one respondent wrote in that Purple loosestrife was a problem. Nine respondents indicated that they own or occupy lakeshore property while six indicated they have channel property. When asked whether they felt that the level of aquatic vegetation at the lake affects their property values 10 indicated it did, three said it did not. All respondents said they were in favor of continued vegetation control. Respondents were presented a list of seven common lake problems and asked to mark which apply to Jimmerson Lake. Canada geese were the lead problem as indicated by 15 respondents. Aquatic plants were close behind being marked by 12 of the respondents. Nine indicated that excessive boat traffic was a problem. Seven respondents indicated that additional speed enforcement was needed. Four indicated dredging was needed, two marked poor water clarity as a concern, and two marked "too much fishing". Residents present who were enrolled in the private shoreline treatments organized by the association indicated that they were pleased with the amount of control achieved in 2007. Overall the meeting attendants were very interested in continuing efforts to manage aquatic plants at the lake and were pleased with plant management results thus far.

Lake User Survey Jimmerson Lake 7/14/07

1. Are you a lake property owner? Yes _____ No _____
2. Are you currently a member of your lake association? Yes ____ No ____
3. How many years have you been at the lake? (circle one) 0-5 years
6-10 years
11-20 years
more than 20 years
4. Has the growth of aquatic plants on Jimmerson Lake ever negatively affected your enjoyment of the lake? Yes _____ No _____
5. How do you use the lake? (mark all that apply)
____Swimming ____Irrigation (including lawn) ____Enjoy View and Atmosphere
____Boating ____Fishing ____View Wildlife ____Skiing/boarding/Tubing
Other _____
6. Do you feel that Jimmerson Lake has Aquatic plants in nuisance quantities at this time(2007)? Yes ____ No ____
7. Do you own or occupy property on a _____channel _____Lakeshore_____Neither
8. Do you feel the level of vegetation in the lake affects your property values? Yes ____ No ____
9. Are you in favor of continuing efforts to control vegetation on the lake? Yes ____
No ____
10. Mark any of these you think are problems on your lake:
____ Too much fishing
____ Canada Geese
____ Excessive boat traffic
____ Dredging needed
____ Too many aquatic plants
____ Not enough aquatic plants
____ Poor water clarity
____ Additional Speed enforcement needed
Other _____

Please add any additional comments on the back:

☐ Check here if commenting on the back

11.0 Public Education

The Jimmerson Lake Association should strive to set reasonable goals for increasing awareness among lake users about lake health issues. The association newsletter and annual June general association meeting can serve as the primary vehicles for disseminating information. An association website might be another way that relevant information can be shared. The following areas should be addressed:

- **Prevention of the spread of Exotic Invasive Aquatic and Wetland Species**

An effort should be made to make lake users aware that their own boat trailers could have introduced Curlyleaf pondweed or Eurasian watermilfoil to the James Chain of Lakes or could spread these plants to other lakes if care is not taken to remove vegetative debris. Basic plant identification should be addressed so new invasive species appearing can be spotted early on by the lake users.

- **Prevention of lake nutrient enrichment.**

An effort should be made to encourage all lake residents to switch to no-phosphorus lawn fertilizers. Residents should also be made aware that soils lost through erosion in the watershed carry nutrients into the lake's waters as do sediments mobilized from the lake's bottom and shoreline by watercraft. Area residents should be aware of proper erosion control techniques at construction sites within the watershed.

- **Expectations and water use restrictions associated with Plant Management**

Residents should be made aware that LARE funds are intended to address only Exotic species of aquatic plants and control of plants will not occur throughout the whole lake with L.A.R.E. funding support. It is also important that residents understand and obey the posted water use restrictions associated with any chemical treatments performed. The proposed switch to Trichlopyr for Eurasian watermilfoil control has been discussed with the Jimmerson Lake Association. Efforts to keep the residents informed of the new product and water-use restrictions involved should be carried out in 2008.

12.0 Integrated Management Action Strategy

Exotic plant management at Jimmerson Lake should take an approach consisting of three tiers of action working toward this plan's aforementioned primary goals:

Tier 1. Nutrient and Sediment control.

The Jimmerson Lake Association should be vigilant in spotting and addressing nutrient and sediment sources in the watershed, stopping pollutants at their source before water quality can be impacted. Recommendations and implemented improvements from the LARE Jimmerson Lake Diagnostic Study and Engineering Feasibility Study should be reviewed periodically and followed up on as needed.

Tier 2. Public Education.

Communicating the above educational points to Jimmerson Lake users can potentially prevent a very costly infestation of new exotic plants and animals at the lake, saving resources that can be utilized to address current problems.

Tier 3. Exotic Plant Control.

Addressing the submersed aquatic non-native plants present on a lakewide basis with professional applications of EPA approved aquatic pesticides and monitoring results closely can potentially limit their spread and preserve the native plant community while providing relief to lake users. The proposed treatment regime for 2008 consists of mapping and treating 16 acres of Eurasian watermilfoil growth with Renovate OTF in May and treating up to 16 acres of regrowth/new growth with Renovate OTF in July. Treatment areas will likely be similar to the 2007 treatment areas depicted in Figures one and two in the Treatment History section of this report. If it is necessary to treat 16 acres twice in 2008 this switch may increase treatment costs by approximately \$8120.00 annually. If the switch to trichlopyr

results in seasonal control with a single dose, treatment costs may actually decrease by approximately \$2000.00 annually. Reasonable treatment response benchmarks of less than five percent Tier II occurrence for both Curlyleaf pondweed and Eurasian watermilfoil should be maintained and relief from the excessive growth of Eurasian watermilfoil in Jimmerson's problem areas should be provided. If the amount of Eurasian watermilfoil colonization of Jimmerson's approximately 264 littoral area is held below the 16 acre figure via treatment, the "below five percent" Tier II results should be very achievable. Five percent of the littoral area is equal to approximately 13 acres. Permitting for 2008 also provides for an optional use of 2, 4-D to maintain control method flexibility if IDNR should not provide cost-share funding in 2008. A Basic Survey of Purple loosestrife in and riparian wetlands should also be performed to formulate an effective control plan to be implemented in 2009.

13.0 Project Budget & Timeline

2008 Season Treatment response benchmarks: Maintain a late season Tier II occurrence of less than 5% for both Eurasian watermilfoil and Curlyleaf pondweed. Provide effective relief of excessive milfoil growth in problem areas.			
Month	Activity	Acreage	Cost Estimate
May	Map Curlyleaf pondweed And Eurasian watermilfoil growth		1300.00
May	Begin Eurasian treatments as needed with Renovate OTF (2 ppm ae 3 ft avg. depth)	16	11,200.00
July	Tier II Survey		2000.00
July	Milfoil Retreatments if needed with Renovate OTF (2 ppm ae 3 ft avg. depth)	16	11,200.00
July	Perform Basic Survey of purple loosestrife in lake and riparian wetlands, formulate control plan		900.00
As arranged	Public Meeting		300.00
October/November	Permit Meeting		200.00
December	Plan Update Document Due		1900.00
	Total Cost, Pesticide Applications		\$22,400.00*
	Total Cost, Consultant		\$6600.00
	Total		\$29000.00*

* Does not include treatments for native plants.

2009 Season Treatment response benchmarks: Maintain a late season Tier II occurrence of less than 5% for both Eurasian watermilfoil and Curlyleaf pondweed. Provide effective relief of excessive milfoil growth in problem areas.			
Month	Activity	Acreage	Cost Estimate
May	Map Curlyleaf pondweed And Eurasian watermilfoil growth		1300.00
May	Begin Eurasian treatments as needed with Renovate OTF (2 ppm ae 3 ft avg. depth)	16	11,200.00
July	Tier II Survey		2000.00
July	Milfoil Retreatments if needed with Renovate OTF (2 ppm ae 3 ft avg. depth)	16	11,200.00
July	Perform Purple loosestrife control in priority areas		900.00
As arranged	Public Meeting		300.00
October/November	Permit Meeting		200.00
December	Plan Update Document Due		1900.00
	Total Cost, Pesticide Applications		\$22,400.00*
	Total Cost, Consultant		\$6600.00
	Total		\$29000.00*

*** Does not include treatments for native plants.**

2010 Season Treatment response benchmarks: Maintain a late season Tier II occurrence of less than 5% for both Eurasian watermilfoil and Curlyleaf pondweed. Provide effective relief of excessive milfoil growth in problem areas.			
Month	Activity	Acreage	Cost Estimate
May	Map Curlyleaf pondweed And Eurasian watermilfoil growth		1300.00
May	Begin Eurasian treatments as needed with Renovate OTF (2 ppm ae 3 ft avg. depth)	16	11,200.00
July	Tier II Survey		2000.00
July	Milfoil Retreatments if needed with Renovate OTF (2 ppm ae 3 ft avg. depth)	16	11,200.00
July	Perform Purple loosestrife control in priority areas		900.00
As arranged	Public Meeting		300.00
October/November	Permit Meeting		200.00
December	Plan Update Document Due		1900.00
	Total Cost, Pesticide Applications		\$22,400.00*
	Total Cost, Consultant		\$6600.00
	Total		\$29000.00*

*** Does not include treatments for native plants.**

2011 Season Treatment response benchmarks: Maintain a late season Tier II occurrence of less than 5% for both Eurasian watermilfoil and Curlyleaf pondweed. Provide effective relief of excessive milfoil growth in problem areas.			
Month	Activity	Acreage	Cost Estimate
May	Map Curlyleaf pondweed And Eurasian watermilfoil growth		1300.00
May	Begin Eurasian treatments as needed with Renovate OTF (2 ppm ae 3 ft avg. depth)	16	11,200.00
July	Tier II Survey		2000.00
July	Milfoil Retreatments if needed with Renovate OTF (2 ppm ae 3 ft avg. depth)	16	11,200.00
July	Perform Purple loosestrife control in priority areas		900.00
As arranged	Public Meeting		300.00
October/November	Permit Meeting		200.00
December	Plan Update Document Due		1900.00
	Total Cost, Pesticide Applications		\$22,400.00*
	Total Cost, Consultant		\$6600.00
	Total		\$29000.00*

*** Does not include treatments for native plants.**

14.0 Monitoring and Plan Update Procedures

The Jimmerson Lake Aquatic Plant Management Program should continue to be monitored and updated on an annual basis. Monitoring will consist of monitoring not only the lake's plant community but the thoughts and opinions of the lake's users. To monitor the lake's plants exotic growth will be remapped each spring and compared with the previous season's growth pattern. A tier II survey in the late season after treatment has been initiated will serve to characterize the lake's overall plant community statistically and also gage if treatment bench marks have been attained. If treatment response bench marks are not attained changes in the treatment timing, chemical used, or integrated approach will all be options for setting a new course toward success. To monitor the thoughts and opinions of lake users at least one public meeting should be held annually and a survey distributed. An open forum at the meeting should exist to allow for discussion of water-use restrictions associated with treatments, new problems arising at the lake, or treatment effectiveness. Updates on program progress and developments should be issued in the Jimmerson Lake Association Newsletter.

15.0 Literature Cited

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Weed Patrol, Inc. 2006. Integrated Aquatic Plant Management Plan 2006-2009. Weed Patrol, Inc. 1922 Fieldhouse Ave. Elkart, Indiana 46517. 574-389-3212

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16.0 Appendices

Appendix 16.1 Plant Survey Data Sheets

Appendix 16.2

IDNR Vegetation Permit Application

Appendix 16.3

Pesticide Use Restrictions / Pesticide Labels

Appendix 16.4
Resources for Aquatic Vegetation Management
(funding and technical assistance)

Appendix 16.5

State Regulations Relevant to Aquatic Plant Management